

Notice of Allowability

Application No.

10/621,929

Examiner

Rip A. Lee

Applicant(s)

SALDIVAR GUERRA ET AL.

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to June 12, 2007.
2. ☒ The allowed claim(s) is/are 1-58 and 89-92.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Stephen S. Hodgson on August 10, 2007.

Cancel claims 59-88.

Allowable Subject Matter

The following is an examiner's statement of reasons for allowance: Claims 1-58 and 89-92 are allowed.

The present invention is drawn to a process of making block copolymer of styrene and unsaturated cyclic anhydride in the presence of stable free radical and free radical initiator where the block copolymer has a polystyrene block and a poly(styrene/unsaturated cyclic anhydride) block wherein the number average molecular weight is greater than about 25,000. In one aspect of the invention, the copolymer block derived from styrene and unsaturated cyclic anhydride is formed first, and a polystyrene block is formed after the unsaturated cyclic anhydride monomer is essentially depleted.

The closest references are Park *et al.* (*J. Poly. Sci., Part A: Polym. Chem.*, 2000) and Visger *et al.* (U.S. 6,531,547).

Park *et al.* discloses a process of making diblock styrene-styrene/maleic anhydride copolymer by polymerizing monomers in the presence of TEMPO/BPO (1.8 mole ratio; [BPO] = 0.033 M) at a temperature of 120 °C, wherein the wt % of units derived from maleic anhydride lie in the range of 0.2-17.5 wt %. The number average molecular weight of polymers lies in the range of 4,300 to 23,500, and the polydispersity lies in the range of 1.23-1.62. The number average molecular weight lies outside the range recited in the instant claims.

Visger *et al.* discloses a process for making a diblock styrene-styrene/maleic anhydride copolymer by polymerizing monomers in the presence of a mixture of TEMPO /BPO at a temperature between 110-200 °C. In one example, a block copolymer has $M_n = 22,610$, $M_w = 55,687$, and $PDI = 2.46$ (corresponding to approximately 96 styrene or maleic anhydride units) and contains a polystyrene block with $M_n = 13,423$ and $M_w = 18,731$ (corresponds to about 138 styrene units), $PDI = 1.37$. The product is prepared by formation of a polystyrene block at about 60 to about 70 % conversion, after which maleic anhydride, and optionally, additional styrene is added to the reaction mixture in order to form the styrene/unsaturated cyclic anhydride block. Additional stable free radical and/or free radical initiator may also be introduced to enable the polymerization of the second block to proceed at an appreciable rate. In contrast to the process

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described by Applicant, the process of Visger *et al.* is set up such that the polystyrene block is formed first, and therefore, polymerization of the entire block copolymer is not performed with a single monomer addition.

The general subject matter of process claims 45-58 is patentably distinct over the closest references, Tanaka *et al.* (U.S. 4,328,327) and Campbell *et al.* (U.S. 6,346,590).

Tanaka *et al.* discloses a continuous bulk polymerization process that is carried out in two stages using a vertical reactor followed by a single-shaft horizontal reactor. The process results in the formation of a uniform copolymer of styrene and maleic anhydride containing a substantially constant amount of maleic anhydride. In sharp contrast, copolymers of the instant invention are block copolymers containing a styrene block and a random styrene/maleic anhydride block.

Campbell *et al.* discloses an apparatus for producing polymers by free radical polymerization and condensation reaction. The reactor is comprised of a primary, continuous stirred tank reactor which is connected in series to a secondary tube reactor. The reference does not disclose use of this configuration to make the polymer of the instant claims. Since the polymer of the prior art is prepared by free radical and condensation means, it would not have been obvious to one having ordinary skill in the art to use this apparatus for making the polymers of the instant claims.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



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August 10, 2007



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